

The opinion in support of the decision being entered today  
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* MARTIN HILLEBRAND BLEES

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Appeal 2006-2571  
Application 09/759,179  
Technology Center 1700

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Decided: March 23, 2007

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Before CHARLES F. WARREN, PETER F. KRATZ , and  
LINDA M. GAUDETTE, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicant appeals to the Board from the decision of the Primary Examiner finally rejecting claims 1 through 3, 5 through 7, and 11 through 14, all of the claims in the Application, in the Office action mailed November 3, 2004. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2005).

We affirm the decision of the Primary Examiner with respect to claims 6 and 11 through 14, and reverse the decision with respect to all other claims.

Claims 1, 6, and 7 illustrate Appellant's invention of a stamp and a method of manufacturing the same, and are representative of the claims on appeal:

1. A stamp for use in a lithographic process, which stamp comprises a stamp body with a printing face, said stamp body having a first recess with an [sic] first aperture in the printing face, wherein

the first recess becomes narrower as its distance to the printing face increases, and

cross-sections of the first recess parallel to the printing face, when projected perpendicularly on the printing face, lie within the first aperture, and a third recess with an [sic] third aperture in the printing face and a depth perpendicular to the printing face that is greater than the depth of the first recess is present in the stamp body,

which third recess has cross-sections parallel to the printing face and becomes substantially narrower as its distance to the printing face increases, said cross-sections, when projected perpendicularly on the printing face, lying within the third aperture,

the aperture of the third recess and the aperture of the first recess each have a dimension in a first direction in the printing face, and

said dimension of the aperture of the third recess is at least five times the dimension of said aperture of the first recess, wherein at least one of the first and third recesses has a triangular shape in a plane perpendicular to the printing face;

wherein the stamp body has a Young modulus greater than  $10^6 \text{ N/m}^2$ , and the stamp body further has an elastic layer disposed therein.

6. A method of manufacturing a stamp for use in a lithographic process, which stamp has a stamp body with a surface which coincides partly with the printing face, comprising the steps of:

anisotropic etching of a surface of a mold into a patterned mold surface, such that a first recess and a second recess are created in the mold with apertures in the original surface, which first recess and a second recess become narrower as its distance to the original surface increases and has cross-sections parallel to the original surface which, when projected perpendicularly on the original surface, lie within the aperture, and wherein the first and second recesses have different apertures;

disposing an unmolded agent between the mold and a first body; and

making a replica of the patterned mold surface in the first body with a patterned surface, wherein the replica contains structures of different sizes.

7. A method as claimed in claim 6, characterized in that a replica is made of the patterned surface of the first body in a second body which has a patterned surface.

The Examiner relies on the evidence in these references:

Hawkins	US 5,201,987	Apr. 13, 1993
Biebuyck	US 5,817,242	Oct. 6, 1998
Whitesides	US 5,900,160	May 4, 1999
Maracas	US 5,937,758	Aug. 17, 1999
Choquette	US 6,245,412 B1	Jun. 12, 2001

Younan Xia and George M. Whitesides (Xia), "Soft Lithography,"  
37 *Angew. Chem. Int. Ed.*, 550-75 (1998).

Appellant requests review of the following grounds of rejection under  
35 U.S.C. § 103(a) (Br.<sup>1</sup> 4), the grounds all advanced on appeal:

claims 1, 2, and 5 as unpatentable over Whitesides in view of Biebuyck as evidenced by Hawkins (Answer 3-4);

claim 3 as unpatentable over Whitesides in view of Biebuyck as evidenced by Hawkins as applied to claim 1 and further in view of Maracas (*id.* 5);

claims 6 and 11 through 13 as unpatentable over Whitesides in view of Biebuyck (*id.* 5-6);

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<sup>1</sup> We consider the Brief filed January 10, 2006.

claim 7 as unpatentable over Whitesides in view of Biebuyck as applied to claim 6 and further in view of Xia (*id.* 6); and

claim 14 as unpatentable over Whitesides in view of Biebuyck as applied to claim 13 and further in view of Choquette (*id.* 6-7).

Appellant argues the claims in the first ground of rejection as a group and argues claims 6, 11, and 12 in the third ground (Br. 5 and 7). Thus, we decide this appeal based on appealed claims 1, 3, 6, 7, 11, 12, and 14 as representative of the grounds of rejection and Appellant's groupings of claims. 37 C.F.R. § 41.37(c)(1)(vii) (2005).

With respect to independent claim 1 and the first ground of rejection, the Examiner contends Whitesides discloses the stamp illustrated in Fig. 3a for use in a lithographic process, which has recesses with apertures 24, "the recess having a triangular shape (Fig 10 and Col 15 lines 39-49)" (Answer 3). The Examiner contends Whiteside does "not expressly disclose recesses of different apertures and or different depths, especially third recess having an aperture at least five times the aperture of the first recess and a greater depth," but concludes "in the real world applications the recesses would be of different sizes, in order to pattern features of different sizes" (*id.* 3-4). The Examiner contends Biebuyck discloses in FIG. 2D "a stamp with different sized apertures" (*id.* 4). The Examiner contends recess depth would be greater with an anisotropic etch in making the stamp in Whitesides, which "fact is disclosed by [Hawkins] who teach (Fig 6 and Col 5 lines 19-23) that in a single isotropic etch varying depths will be obtained for different size of vias" (*id.*). The Examiner concludes that it would have been obvious to one of ordinary skill in the art "to have a stamp with varying number of recesses and varying recess apertures" (*id.*).

Appellant contends

[t]he Examiner proposes a result that is not supported by the [Whiteside] method which is directed to creating a stamping surface having a pattern of closely-spaced features. *See* Col. 7, lines 10-18. The Examiner's proposal to modify this pattern to include different sized apertures would destroy the closely-spaced relationship of the [Whitesides] features in the stamping pattern. For example, by providing a larger aperture in a pattern seemingly defined by closely-spaced protrusions, the protrusions defining the larger apertures are no longer closely spaced; therefore, the larger aperture destroys the close spacing which is intended to define the pattern, thereby undermining the method of the [Whitesides] reference. *See* Col. 7, lines 10-18.

Br. 7. Appellant further contends the Examiner does not present evidence establishing that Hawkins' bath etch "applies to the claimed stamp fabrication" (*id.*).

The Examiner responds Whitesides' disclosure that "'The stamping pattern includes closely spaced features' . . . does not exclude larger spaced features" (Answer 7). The Examiner contends Hawkins "is used to show that typically a larger aperture would result in a deeper etch compared to a smaller aperture" (*id.*). Appellant replies the Examiner's reliance on Hawkins "is based on the narrow assumption that a certain etching technique 'would result in a deeper etch'" which is incorrect "as many etching techniques for making a larger aperture would result in a shallower etch," and for the Examiner's position to be supported, "the corresponding etching technique that created the result would also have to be relied upon" (Reply Br. 7).

With respect to claim 3, dependent on claim 1, and the second ground of rejection, the Examiner contends Whitesides does “not expressly disclose feature size to be less than 1  $\mu\text{m}$ ,” and finds Maracas would have disclosed a stamp with micron and submicron feature size (Answer 5; citing Maracas col. 3, ll. 22-25 and col. 8, ll. 17-18). The Examiner concludes that “[a]s feature size in integrated circuits is being required to be more and more narrower it would have been obvious to one of ordinary skill . . . to make the stamp of Hawker [sic, Whitesides] with sub micron feature size to be able to pattern sub micron features” (*id.*).

Appellant contends the Examiner presents no evidence that Whitesides’ teachings “could be further modified to include sub-micron features” (Br. 8). Appellant argues Whitesides’ “teachings acknowledge the resulting deformation of a stamp created and used in accordance with the reference’s teachings. This deformation prevents spacing of apertures within one micron as the deformation would destroy such spacing. *See* Figs. 3a-c and Col. 10, lines 6-15” (*id.*).

The Examiner responds “[a]t Col 10 lines 6-15 [Whitesides] state that the compressive force would deform and reduce feature size. This does not mean that sub micron features may not be obtainable,” arguing “sub micron feature size is obtained by design and not by using the stamp at high compressive force thereby to deform the stamp” (Answer 8). Appellant replies “[a] skilled artisan would not be motivated to modify [Whitesides’] teachings to create an inoperable embodiment, *e.g.*, the destruction of the spacing due to deformation would render the stamp inoperable” (Reply Br. 8).

The issues are whether the Examiner erred in concluding it would have been prima facie obvious to one of ordinary skill in the art to arrive at the claimed stamp as encompassed by claim 1 from the combined teachings of Whitesides, Biebuyck, and Hawkins, and as encompassed by claim 3 from the combined teachings of Whitesides, Biebuyck, Hawkins, and Maracas.

The plain language of independent claim 1 specifies a stamp with at least three recesses with apertures, “a dimension in a first direction in the printing face” of the aperture of a “first” recess is at least five times the same dimension of the aperture of another or “third” recess and at least one of these two recesses “has a triangular shape in a plane perpendicular to the printing face.” The plain language of dependent claim 3, describes the last of the three recesses, that is, the “second” recess, which has an aperture that “is present at a distance smaller than 1  $\mu\text{m}$  from the aperture of the first recess.” Thus, the apertures and recesses in the embodiments encompassed by these claims are not uniform. An embodiment falling within these claims is illustrated in Specification FIG. 1. This figure shows a vertical cross-section of stamp 10 having triangular recesses 11,12,13 with respective apertures 15,16,17, wherein recesses 11,12 are of the same dimensions and recess 13 is substantially larger (Specification 10:23-31).

We find Whitesides would have disclosed to one of ordinary skill in this art an embodiment of a method of etching articles via microcontact printing resulting in a pattern with micron and submicron features (Whitesides cols. 1-5). In this method, *inter alia*, a resist coated article is contacted with a stamp to transfer to the article a self-assembled monolayer

of a molecular species in a pattern from which the molecular species spreads to unstamped areas in a controlled manner to result in regions that are very closely spaced, as illustrated in FIGs. 1a-d (*id.* col. 7, l. 4, to col. 9, l. 30; *see also* col. 3, l. 64, to col. 4, l. 7, and col. 4, l. 64, to col. 5, l. 15). The pattern of stamp 20 shown in FIG. 1a is provided by a plurality of indentations 24 and stamping surfaces 26, and “includes closely-spaced features” wherein “the indentations are closely-spaced and this results in the presence of closely-spaced protrusions” and stamping surfaces 26 are “a plurality of elongated ridges” (*id.*, col. 7, ll. 10-18, and col. 8, l. 66, to col. 9, l. 1). The indentations 24 and stamping surfaces 26 are shown as having uniform width and depth. The stamping surfaces 26 remain in contact with the surface of the article to allow the molecular species to spread to uncontacted areas of the surface to form an increasingly narrow uncoated gap 38 between the areas of molecular species (*id.*, col. 7, l. 32, to col. 8, l. 31, and FIGs. 1b-c). The width between stamp indentations 24 separating protrusions defining stamping surfaces 26 is 3 microns, and gap 38 between the adjacent regions of the self-assembled monolayer that have spread toward each other is 0.1 micron (*id.*, col. 8, ll. 41-49, and FIG. 1d). Patterns formed with this method are illustrated in FIGs. 1e-f (*id.* col. 8, l. 51-65). Patterns formed by applying stamp 20 in several orientations are illustrated in FIGs. 2a-e (col. 9, ll. 1-30).

We find Whitesides illustrates another embodiment in FIGs. 3a-c in which stamp 20 is deformed by compressive forces 44,46 applied parallel and perpendicular, respectively, to the printing surface prior to and/or during transfer of the species to the surface, resulting in, *inter alia*, the



reduction of the dimensions of indentations 24 and the spacing between stamping surfaces 26 resulting in a smaller gap 38 available for etching (Whitesides col. 9, l. 32, to col. 10, l. 18, and col. 22, ll. 19-24). The indentations 24 and stamping surfaces 26 are shown as having uniform width and depth. Results obtained with stamp deformation are illustrated in FIGs. 4a-d wherein regions 50 represent etched surfaces and, according to the scale, are extremely uniform and, in FIGs. 4c-d, narrow (*id.*, col. 10, ll. 19-61).

We find Whitesides illustrates in FIGs. 5a-c a method of applying a patterned, self-assembled monolayer to a nonplanar surface wherein stamping surface 26 and accompanying indentations in stamp 20 are shown as having uniform width and depth (Whitesides col. 10, l. 66, to col. 11, l. 54). Whitesides illustrates in FIGs. 6a-c a “stamping pattern [that] includes features similar to those found in typical electronic circuitry” in which the formed features of uniform width reasonably appear to result from a stamp with stamping surfaces and indentions of uniform width and depth (*id.* col. 11, l. 55, to col. 12, l. 7).

We find Whitesides discloses that making article 74 includes etching a pattern into a surface by any known method and using the etched surface as a template on which to mold an article (Whitesides col. 14, ll. 21-28). The process illustrated in FIGs. 9a-f forms article 60 (FIG. 9e) as a template to form, *inter alia*, article 74 (FIG. 9f) having triangular projections 77 and separating indentations of uniform width and depth, which “can be a stamp used for microprinting, as described” (*id.* col. 14, ll. 28-66). Template 60 can be formed with grooves or pits by anisotropic etching, thus forming at

their deepest portions a ridge or point in article 74 (*id.* col. 15, ll. 3-19, and col. 22, ll. 24-28). Article 74 illustrated in cross section in FIG. 9f has uniformly spaced triangular projections 77 with ridges forming stamping surface 81.

We find Whitesides FIG. 10 is an atomic force microscope image of projections 77 with stamping surface 81 of article 74 in FIG. 9f, showing triangular projections and separating indentations of uniform width and depth (Whitesides col. 10, ll. 39-49). Whitesides discloses that stamping surface 81 can “include features having a lateral dimension of approximately 0.100 micron or less” as well as “small, isolated projections” that “approximate a point,” all of which can be in “an ordered array” (*id.* col. 14, ll. 28-66).

Contrary to the Examiner’s finding, article 74 of FIGs. 9f and 10 is not stamp 20 of FIGs. 1a-d and 3a-c.

We find Biebuyck would have disclosed in FIG. 2D an elastomeric stamp for use in a lithographic process which has deformable or elastic layer 24 for conformal contact and a second patterned layer 22 with rectangular stamping surfaces and indentations with submicron features of non-uniform width and depth (Biebuyck cols. 1 and 2, and col. 3, l. 28, to col. 4, l. 12).

We find Hawkins would have described in FIG. 6 the last step of a fabrication process of a three dimensional structure from silicon substrate 12 in which the frontside surface 12A of the silicon substrate with mechanically protective layer 16 and patterned masking layer 14 is anisotropically etched to produce recesses 32 and remove layer 16, wherein

vias 29 in layer 14 are of different sizes to produce recesses of varying depths (Hawkins col. 5, ll. 1-23).

We find Maracas would have disclosed in FIG. 2 a stamp with support structure 102 and flexible layer 104. The flexible layer 104 includes stamping face 105 having contact surfaces 108 separated by recessed surfaces 107 which define depressions 106, the contact surfaces and recesses of uniform width and depth as seen from the patterned surface 113 formed by etched plate 112 in FIG. 3 (Maracas col. 3, ll. 5-28, and col. 3, l. 53, to col. 4, l. 20). “[T]he stamping pattern has micron features and/or sub-micron features” which can be less than one micrometer (*id.* col. 3, ll. 21-25). Maracas discloses that the stamp with uniform features illustrated in FIG. 2 achieves “[u]niform pattern transfer . . . when . . . surfaces **108** makes [sic] undistorted physical contact with the surface of the substrate” resulting in the transfer of an “undistorted pattern” (*id.* col. 3, ll. 29-35).

On this record, we agree with Appellant. The Examiner has not adduced either scientific explanation or evidence establishing that, *prima facie*, one of ordinary skill in this art would have been led by Whitesides alone or by this reference combined with Biebuyck, Hawkins, and Maracas as applied to modify the stamps used in the microprinting method disclosed by Whitesides to arrive at the claimed stamps encompassed by claims 1 and 3. As Appellant contends, the evidence in Whitesides points to a uniform pattern of features in the stamping surfaces in order to control the formation of uniform regions of self-assembled monolayer of molecular species by contacting the stamp or controlled deformation of the stamp in the disclosed

methods. There is no evidence in Whitesides that the features reflected in stamping surfaces and indentations of the stamps illustrated in the figures thereof do or can differ and that a stamp with non-uniform width and depth features can be useful in the disclosed processes. In this respect, we determine one of ordinary skill would interpret the recitation in Whitesides relied on by the Examiner, “[t]he stamping pattern includes closely-spaced features . . . defining stamping surface 26” (Whitesides col. 7, ll. 10-18), as specifically directed to the stamping pattern provided by stamping surfaces 26 on stamp 20. Thus, the word “includes” in context indicates a part of the stamp as opposed to a class of stamps.<sup>2</sup> Indeed, the Examiner states that Whitesides does “not expressly disclose recesses of different apertures” (Answer 5). Thus, while there may be “real world applications” that involve etching non-uniform patterns in a substrate, the Examiner has not established that one of ordinary skill would have modified Whitesides’ stamps in the context of the reference process on that basis alone. *See, e.g., B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996) (“When obviousness is based on a particular prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. This suggestion or motivation need not be expressly stated.” (citation omitted)).

The combinations of Whitesides with Biebuyck, Hawkins, and Maracas as applied also do not support the Examiner’s position. The Examiner does not explain why one of ordinary skill in this art would have

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<sup>2</sup> *See, e.g., include, The American Heritage Dictionary Of The English Language* 887 (4th ed., Boston, Houghton Mifflin Company, 2000).

found in Whitesides' disclosure a teaching that the microprinting processes disclosed therein can be practiced with a stamp having non-uniform features such as the stamp used in the different processes of Biebuyck. Further, one of ordinary skill would not have a different view of Whitesides' disclosure simply because of the use of an anisotropic etch therein and in Hawkins, the latter in fact etching a substrate to form a device which is not used as a template for molding another article. This person also would not have found further guidance to modify the stamp of Whitesides, which can have a ridge or point of approximately 0.100 micron or less, by the disclosure in Maracas of a feature of less than one micron in a stamp with uniform features. *See, e.g., In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) ("The test for obviousness is not whether . . . the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.").

Accordingly, in the absence of scientific reasoning or evidence supporting the Examiner's conclusion of prima facie obviousness, we reverse the grounds of rejection of claims 1 through 3 and 5 under 35 U.S.C. § 103(a). *See e.g., In re Rouffet*, 149 F.3d 1350, 1358, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998) ("hindsight" is inferred when the specific understanding or principal within the knowledge of one of ordinary skill in the art leading to the modification of the prior art in order to arrive at appellant's claimed invention has not been explained).

With respect to independent claim 6 and claims 11, 12, and 14 dependent thereon, and the third and fifth grounds of rejection, the

Examiner contends Whitesides discloses “a method of manufacturing a stamp for use in a lithographic process (Fig 8a[sic, 9a]-9f Col 14 line 28 to Col 15 line 19) which includes anisotropic etching of a surface” (Answer 5). The Examiner contends Whitesides does “not expressly disclose recesses of different apertures” but concludes “the method of manufacturing a stamp of different apertures would be to use masking of different apertures” (*id.*). The Examiner contends Whitesides does not disclose using an unmolding agent” and Biebuyck discloses the unmolding agent perfluorinated silane (*id.* 5-6, citing Biebuyck FIGs. 2A-2D and col. 4, ll. 7-9). The Examiner concludes that it would have been obvious to one of ordinary skill in the art “to have a stamp with varying recesses to micro print features of varying dimensions” (*id.* 6).

Appellant contends that Whitesides does not disclose “making a replica of the patterned mold surface in the first body with a patterned surface, wherein the replica contains structures of different sizes” as specified in claim 6 (Br. 5). In this respect, Appellant contends the Examiner has not presented evidence “that different sized apertures may be achieved merely by masking” (*id.*). Appellant contends as Biebuyck only indicates “the separating agent is applied to master[, that is, mold,] substrate 20, this teaching cannot correspond to the limitations of both” claim 11, wherein the unmolding agent is applied to the surface of the mold, and claim 12, wherein the unmolding agent is applied to the surface of the first body in which the mold surface is replicated (*id.* 6). Appellant extends these arguments to claim 14 (*id.* 8).

The Examiner responds the rejection of these claims “relies on the fact that different sized apertures could be obtained by using mask with different apertures” and “does not require larger depth for larger aperture” (Answer 8).<sup>3</sup> With respect to claims 11 and 12, the Examiner contends “[s]ince unmolding (separating) agent helps to separate the mold from the first body it could obviously [sic] applied to any of the separating surfaces” (*id.*). Appellant replies “while [claim 6] may not require ‘larger depth for larger aperture,’ it does require making a replica having ‘structures of different sizes,’ to which the Examiner has not presented any corresponding evidence” (Reply Br. 5). Appellant contends, with respect to claims 11 and 12, Biebuyck applies the separating agent only to master or mold substrate 20 and thus, ‘this teaching cannot correspond to the limitations of both claims 11 and 12’ (*id.* 6).

The issues are whether the Examiner erred in concluding it would have been *prima facie* obvious to one of ordinary skill in the art to arrive at the claimed method encompassed by claims 6, 11, 12, and 14 from the combined teachings of Whitesides and Biebuyck.<sup>4</sup>

The plain language of independent claim 6 encompasses a method of manufacturing a stamp comprising at least the steps of anisotropically

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<sup>3</sup> The Examiner’s reliance on Hawkins with respect to these grounds of rejection is misplaced as this reference is not included in the statement of these grounds of rejections. Thus, we will not consider Hawkins here. *See In re Hoch*, 428 F.2d 1341, 1342 n. 3, 166 USPQ 406, 407 n.3 (CCPA 1970); *cf. Ex parte Raske*, 28 USPQ2d 1304, 1304-05 (Bd. Pat. App. & Int. 1993).

etching a mold to form a pattern therein having first and second recesses with different apertures, disposing an unmolded agent between the mold and a first body, and making a replica of the patterned mold surface in the first body with a patterned surface, wherein the replica contains structures of different sizes.” We interpret this language to encompass any difference in the size of the structures of the replica. The plain language of dependent claim 11 specifies the unmolding agent is applied to the surface of the mold, and of dependent claim 12 specifies the unmolding agent is applied to the surface of the first body.

We have considered Whitesides’ disclosure of the process of forming stamp 74 by anisotropically etching mold 60 and forming the stamp thereon as illustrated in FIGs. 9a-f, and of an atomic force microscope image of stamp 74 in FIG. 10 (*see above* pp. 9-10). We find here that Whitesides discloses the “pattern etched into article 60 . . . corresponds approximately to a pattern of gaps between closely-spaced regions of self-assembled monolayer 27 (FIG. 9a)” (Whitesides col. 14, ll. 50-56, and col. 15, ll. 3-19). Whitesides discloses a hardenable fluid is applied to surface 62 of article or mold 60 is hardened into article or stamp 74 (*id.* col. 14, ll. 56-66). The image in FIG. 10 shows that the projections 77 on stamping surface 81 of stamp 71 are not precisely of equal dimensions.

We find Biebuyck would have disclosed the surface of master or mold substrate prepared by conventional lithography methods is treated

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<sup>4</sup> Appellant does not specifically contest the combination of Whitesides, Biebuyck, and Choquette to claim 14 (*see above* p. 14), and accordingly, we do not further consider claim 14 and the applied combination.



with separating agent perfluorinated silane to which is applied a layer of, for example, a pre-polymer of poly(dimethylsiloxane) which is cured to form the features of the stamp (Biebuyck, e.g., col. 2, ll. 3-14, col. 3, ll. 44-47, col. 4, ll. 2-12, FIGS. 1A-E and 2A-D).

We find in the combined teachings of Whitesides and Biebuyck evidence supporting the Examiner's position. We determine the stamp or replica 74 prepared by the methods of Whitesides can have "structures of different sizes" as required by claim 6 as seen from the image in FIG. 10. We further determine that Biebuyck shows the application of the perfluorinated silane to the surface of the mold which satisfies the limitation of claim 11. We are of the opinion that one of ordinary skill in this art would have applied the unmolding agent to the surface of moldable material applied to the surface of the mold as this step constitutes the only other option for inserting the unmolding agent between the mold and the moldable material.

Therefore, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Whitesides and Biebuyck and of Whitesides, Biebuyck, and Choquette with Appellant's countervailing evidence of and argument for nonobviousness, and conclude that the claimed invention encompassed by appealed claims 6 and 11 through 14 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

With respect to claim 7, dependent on claim 6, and the fourth ground of rejection, the Examiner contends Whitesides does not disclose a replica is made of the patterned surface of the first body or stamp in a second body as

claimed (Answer 6). The Examiner contends Xia shows at “page 562-4.1A” the “method of making [sic] replica of a rigid mold” (*id.*). The Examiner concludes it would have been obvious to make “a replica of stamp body of claim 6 . . . so as to be able to pattern with the same polarity as the original stamp” (*id.*). Appellant contends “none of the replica molding methods shown in [Xia] Fig. 4.1 show the use of a second body, as claimed” (Br. 6). The Examiner responds “[s]ince replica could be made from first body to second body or even further the method of making replica reads on the claim” (Answer 9). Appellant replies the Examiner has not identified correspondence between evidence in the applied references and the limitations of claim 7 and thus, relies on hindsight (Reply Br. 6-7).

The plain language of dependent claim 7 specifies the patterned surface of the first body is replicated in a second body.

Xia shows in the procedure in steps “A) REM” illustrated in FIG. 17 at page 562, the same three steps illustrated in Whitesides FIGs. 9d-f.

We agree with Appellant that the applied references do not show the step specified in claim 7. Indeed, there is no teaching in either Whitesides or Xia which would have suggested to one of ordinary skill in this art that the stamp or first body replicating the pattern of the mold would in turn be used as a mold to replicate another stamp or second body. On this record, we further agree with Appellant the Examiner employed hindsight in reaching the conclusion of obviousness. *See, e.g., Rouffet*, 149 F.3d at 1358, 47 USPQ2d at 1458.

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Accordingly, in the absence of scientific reasoning or evidence supporting the Examiner's conclusion of prima facie obviousness, we reverse the grounds of rejection of claim 7 under 35 U.S.C. § 103(a).

The Primary Examiner's decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

AFFIRMED-IN-PART

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